Section of Medicine

President J G Scadding FRCP

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Henry Barnes Lecture

The Contribution of Clinical Academic Departments to the Advancement of Medicine

by Professor K W Donald DSC MD FRCP FRSED
(*Department of Medicine, Royal Infirmary, Edinburgh*)

I did not have the pleasure of meeting Henry Barnes. He was a Cumberland man. He was born in 1842 and died in 1921 when I was a young schoolboy. Henry Barnes was an Edinburgh medical graduate of 1864, obtaining first class Honours in his final examination and later proceeding to his MD. He was proud of his medical school and that is why I, as Professor of Medicine of that University, am here today. Dr Barnes returned to Carlisle in 1866 as physician to the Carlisle Dispensary, becoming consultant physician to the Cumberland Infirmary in 1873. He served his hospital and community for nearly fifty years with great distinction, showing outstanding administrative as well as professional ability. He served on the Central Council of the British Medical Association for thirty-two years and was President of the Association in 1896. He received the honorary degree of LLD from McGill University in 1897. He was a Fellow of the Royal Society of Edinburgh. He served as a magistrate for thirty-four years and was an important officer of the British Red Cross Society. Like many border men he was an historian and antiquarian of some distinction. He published a number of papers on Roman medicine, particularly in Great Britain, and was a Vice-President of the History of Medicine Section of this Society. He is still remembered by many with great affection and respect.

The function of the Barnes lectures is to describe and discuss the contributions that clinical academic departments have made to the practice of medicine. A number of full-time clinical academic appointments were first made in this country in 1920 during the last year of Dr Barnes' life.

As this is the inaugural lecture, I felt it would be appropriate to discuss the subject in the widest terms rather than discuss in detail the contributions by clinical academicians in the subjects in which I have worked and have been interested. Although clinical academic medicine and, indeed, the whole of British medicine are in an intense period of reassessment and impending reorganization, with innumerable known and unknown difficulties ahead of us, I feel that if Henry Barnes were with us today he would not be entirely unimpressed by the progress that British medicine has made. I am sure he would approve of the main aims of the National Health Service and I hope he would not be disappointed in the record of full-time academic clinicians and the professorial units over the last fifty years.

The aims of these full-time academic units were clearly stated by Flexner in his brilliant report in 1912. He felt that there should be greater emphasis on and involvement in the scientific basis of medicine. Again, he felt that this scientific outlook and practice should be closely integrated into clinical teaching. With extraordinary foresight he also considered that as medicine and its various specialties became more advanced, it would be necessary to convert more and more clinical areas in teaching hospitals into departments with research facilities to link with their complex service and investigative amenities. He felt that the staffing structure and control of beds in teaching hospitals were too rigid and that there should be increased opportunity to vary both to cope with ever-changing needs and emphasis in treatment, teaching and research. Finally, he did not like our systematic didactic lectures nor our extreme reliance on the

examination system at all stages of the professional career.

Let us try to measure the degree of success of academic departments in achieving these aims. They have certainly increased the scientific basis of the practice and teaching of medicine. They have studied the disturbances of function in a wide variety of diseases, both acute and chronic, and these studies have led to more rational therapy as well as more rational teaching. They have defined the accuracy of their methods of investigation and learned to judge the significance of their findings. The modern young doctors, and indeed students, have been taught to look for the authority of the scientific evidence rather than the authority of the person presenting it.

Academic departments have also had the important function of linking with scientists in an ever widening range of disciplines. They have not only worked with these men but also been able to stimulate them to apply their special knowledge and gifts to particular problems which are related to topical medical advances or requirements. There is also increasing liaison with engineers and technicological experts. Again, these departments have been able to play a very active part in the development and application of new ideas and techniques to everyday clinical practice.

I can only give a relatively few examples of some of these activities and I hope that no one will be offended by many important omissions.

First I will briefly mention the development of intracardiac and intravascular investigations. The use of the cardiac catheter and intra-arterial needle was first introduced into clinical investigation and practice by academicians. There was considerable criticism and opposition for a number of years. When I was fortunate enough to work with André Cournand in the 1940s, he would hover around like an agitated Svengali pondering the possible dangers against the incalculable benefits that would result. These benefits are now history; the rate of advance of understanding of cardiovascular function in health and disease has been phenomenal. I often wonder whether the cardiac catheter and all the discoveries and therapeutic advances stemming from its use would ever have been seen if there had been an ethical committee in the hospital where it was first developed. Medical ethics are of paramount importance, but it is far easier to do nothing new and appear the more righteous. We have a responsibility to future generations as well as to our present patients, and academic units have felt that this responsibility to the future is particularly theirs.

Moving on to the gastroenterological field, the development of fibre-optic endoscopy, where Hirschowitz co-operated with Wolff, an engineer, has allowed safe and efficient visualization of the upper and lower abdominal tract. Impaling the patient on rigid steel instruments will soon be classified with sword-swallowing, or worse. Intraluminal biopsy, cytology and photography are all increasing the efficiency and reducing the dangers of gastroenterological investigation. Percutaneous liver biopsy was developed in clinical academic units. Discoveries concerning disordered gut secretion and motility have cast new light on many alimentary disorders. Observations in academic units have stimulated physiologists to make new and effective attacks on the nature of circulating peptides and amino acid complexes in various diseases.

The discovery of portal systemic encephalopathy by Sherlock and her colleagues has released many hundreds of apparently insane people from asylums by the elimination of proteins from the diet and the application of antibiotics.

The brilliant use of chromatography at University College Hospital to identify new syndromes is another outstanding achievement. Here, porphobilinogen was isolated in its pure form by Westall. The important ground work to allow the introduction of penicillamine in the treatment of Wilson's disease was carried out here. These would be formidable achievements even for heavily funded full-time scientists.

Going back, Edward Mellanby, who was appointed to one of the first full-time clinical academic appointments in Sheffield in 1919, demonstrated that the rickets in British industrial cities was a remedial deficiency disease. Even more remarkably, it was he who first had the inspired idea that there might be an association between carcinoma of the bronchus and smoking.

Mention should be made of the early work on medical genetics in Liverpool, leading particularly to the brilliant research into the prevention of rhesus disease of the newborn and the genetic factors in the variable reaction to drugs.

The outstanding fundamental work of Pickering and Peart on renin and angiotensin with the demonstration of the structure of angiotensin by Peart is well known. The London Hospital Medical School, under the leadership of Wilson, has made remarkable contributions on experimental hypertension, the renal vascular lesions in accelerated hypertension and the elucidation of diabetic nephrosclerosis.

A large number of academicians, Black, Milne, Bull, Robson, Wrong and others have greatly expanded our knowledge of renal physiology and pathophysiology, particularly in relation to the nature and treatment of acute and chronic renal failure. Work in Birmingham and Edinburgh has greatly increased our knowledge of the nephrotic syndrome.

The developments of hæmodialysis by de Wardener and other academic units have made this country foremost in the world in the national organization of this form of treatment. Although renal transplantation is now accepted as routine therapy, it has been almost entirely developed by clinical academicians throughout the United Kingdom, such as Woodruff, Calne and many others.

I can only mention briefly the role of academic departments in the enormous expansion of our knowledge of functional disturbances in lung disease and in acute or chronic respiratory failure. In the 1940s, the measurement of arterial blood gases and pH, of the diffusing capacity (transfer factor) and of ventilatory work was the preoccupation of a small number of academicians who were not infrequently accused of indulging in esoteric and incomprehensible activities. Yet all these procedures and measurements are now part of everyday clinical practice. The discovery of the occurrence and dangers of carbon dioxide narcosis during oxygen therapy in the late 1940s was frankly disbelieved for a time. Recent research into the physiological disturbances in asthma has shown how naive and invalid our accepted ideas are and has led to a new and vigorous attack on this disease.

The ever accelerating advances in cardiology and cardiac surgery are the happy results of the combined efforts of academicians and full-time and part-time specialists in these fields. The cautious approach of the British academician to heart transplantation is worthy of note. The major problem of coronary arterial disease is being studied intensively in a wide variety of aspects. Epidemiological studies, as pioneered by Morris, are being carried out in more and more centres. Edinburgh has just completed a survey throughout the whole of its city of acute myocardial infarction. Regimes that may have prophylactic value are under controlled trials in many centres. The purpose-built coronary care unit, which was a thing of wonder a short while ago, is now a part of the standard medical scene. The relatively effective control of many dangerous cardiac arrhythmias, including ventricular fibrillation, is, again, just routine medicine although there is much more to be achieved in this field. Cardiogenic shock, apart from that caused by heart rate disturbances, is as yet undefeated despite intensive effort and research.

The psychological reactions and background of patients with coronary arterial disease and indeed many other diseases are now being studied more precisely. The reaction to the event of myocardial infarction, to its treatment, to the residual physical and sometimes psychological disability and even the varying reactions of cohorts and relations are all under close examination. In many of these studies two, three or even four departments are working together.

Turning to other subjects, there has been an explosive development of the discipline of anæsthesia in the last twenty years. The physiological and pathophysiological situation of the anæsthetized patient is now far more precisely known. The cardiorespiratory sophistication of the modern anæsthetist largely stems from men who trained in departments of medicine under disciples of Riley, Cournand, Christie, Comroe and others. The effective and safe uses of relaxants, hypothermia and controlled hypotension have been largely developed in clinical academic departments. The modern anæsthetist has accepted wider responsibilities in post-operative and intensive care, particularly in relation to acute respiratory failure.

Dermatology has moved far from its position of descriptive elegance and therapeutic empiricism. The discovery in Newcastle that in various skin diseases, psoriasis for example, apparently normal as well as abnormal skin may have metabolic disturbances that affect total bodily health, is an important breakthrough. The increasing link between skin disease and malabsorption is another exciting aspect. Turk's work on delayed immunity is giving a new understanding of the dreadful disease of leprosy.

Present Position

Time does not allow me to continue and complete this review of achievement. I hope it will be agreed that clinical academic departments have certainly made important contributions to the understanding and treatment of diseases. They have not only influenced both undergraduate and postgraduate students but also their nonacademic colleagues. Standards have risen. Unfounded claims concerning new therapies are now exceptional and usually short lived. There is full debate and challenge between all levels of doctors, academic or nonacademic.

It is an interesting reflection as to what British medicine would have been like without clinical academic departments.

However, there are still many unresolved difficulties and deficiencies and it is important that these should be looked at carefully and honestly. When Platt got among the academic pigeons in his Harveian Oration, a number of people were greatly put out. Yet we should be only too ready to consider such criticism. Platt pointed out that very few fundamental discoveries of wide application in medicine were made in clinical academic units. The isolation of essential factors and the development of new powerful drugs were, in fact, mainly the work of scientists in industrial labor-

atories. Yet a little reflection would make it obvious that the chance of such discoveries or developments occurring in clinical academic units is very small indeed. The staff of such units, which is not large, has clinical, teaching and administrative duties as well as research responsibilities. There is, in our present structure, a rapid turnover of staff, particularly in the junior and middle range. Departmental recurrent funds are of the order of £2,000 to £5,000 per annum and this includes the running of offices and various teaching expenses. Extramural funding (soft money) may help but it is for limited periods with temporary and insecure staff. The work done under these conditions is, in my view, truly remarkable but to expect such units to develop new drugs in competition with full-time scientists supported by the enormous organization and finances of large commercial firms is absurd. Even in these instances, vitamin B_{12} for example, the initial stimulus was often from clinical departments.

We are accused of spending too much time and energy studying the esoteric minutiæ of disease, particularly chronic and irreversible disease. Yet such studies, which are at all stages of disease, have greatly improved and rationalized therapy and, as important, rationalized a great deal of clinical teaching. The first golden glint of a great discovery is often from under the mass of careful, conscientious and detailed investigation. A number of these studies have shown how chronic disease may be insidious in onset and progress and have high-lighted the importance of early therapy or of prophylaxis. Chronic bronchitis and chronic pyelonephritis are two examples that come to mind. Again, the capacity to measure in detail the effects of disease on function also gives us the ability to determine the effects of new drugs with greater precision. This is a useful and important activity of academic units. These effects are usually first measured in normal subjects (often doctors) and later in patients with relevant diseases. There is a great need for more investigation into the metabolism and action of new and, indeed, some old drugs. The rapid growth of applied or clinical pharmacology as a discipline is welcome and long overdue, but many such studies will still be needed in other academic departments with particular expertise and facilities.

Platt considered that some investigations in academic units could be described as 'occupational therapy for the university staff' or, not to put too fine a point on it, plain silly. He paid me the unique but doubtful compliment of choosing one of my own investigations as a particular illustration of this. The investigation was part of a series of studies into the cardiac output and its distribution at rest and on exercise in normal and disabled subjects. The one he highlighted concerned the splanchnic blood flow on exercise in patients with a restricted cardiac output. We had first carried the study out on ourselves and then on the patients, with their permission, during a routine pre-operative cardiac catheterization. Harvey was interested in the possible changes in distribution of the blood pumped by the heart and if the technique had been available, might well have tried to measure it.

I cannot imagine that Lord Platt really believes that the blood flow to vital organs in the low cardiac output state is unimportant. The treatment of cardiogenic shock, the pathogenesis of hypertension and the increased safety of patients during and after extracorporeal circulation may well depend on increased knowledge of the regional circulation.

Nevertheless, let me join with Platt in saying that badly thought-out investigations which do not ask a particular question or test a definite hypothesis are a waste of time, money and effort and, if even the slightest hazard is involved, are highly unethical.

Platt felt that there were far greater problems that were not receiving adequate attention such as mental illness and behavioural disorders including drug addiction, delinquency, alcoholism and aggression. The great increase of antisocial and anti-self behaviour adds weight to his strictures. He was concerned that too large a proportion of talent and available money was devoted to the laboratory work in traditional academic clinical departments. I feel that he can be reassured. The departments of psychiatry and social medicine are not only expanding throughout the country but are attracting more and more able young doctors. The links between the traditional academic departments and these 'new' departments grow even stronger. The so-called 'ivory towers' of the academic departments are already overwhelmed by multiple academic responsibilities, insufficient administrative support and far too little money and space. It is flattering that it is suggested that we have enough reserve, energy and capabilities to attack behavioural and social problems on an even wider basis, but considerable reorganization and money would be needed.

We have, in Edinburgh, been making attempts for several years to set up a Division or Institute of Forensic Science where all relevant disciplines can discuss and study together the possible causes and prevention of deviant behaviour and its attendant tragedies. Here are psychiatrists, forensic psychiatrists, physicians, toxicologists, clinical pharmacologists, lawyers, criminologists, geneticists and many others all ready to make a combined effort on this important front. Yet we have been unable to recruit any significant sup-

port. It is not the doctors who need stimulating, it is the politicians.

Finally, Platt feared that the scientific approach inhibited compassion and insight into the mind and problems of the whole patient. Yet to seek and use knowledge to cure or ameliorate is surely the greatest gift one can give. Scientific objectivity in no way precludes kindness and communication. I have found great compassion to be scattered randomly among all types of physicians with no relation to their degree of scientific achievement. I suspect that compassion depends partly on example but is mainly genetic.

If I may, I will turn briefly to two of Flexner's other criticisms of British medicine. Firstly, with regard to the medical curriculum, medical education has improved immeasurably. The great series of systematic lectures to the students of the whole year is rapidly disappearing. Lectures no longer present orthodox sections of what can be found in the textbooks but are aimed to interest and stimulate. The causes of the various phenomena encountered in the disease processes are discussed and the many disciplines that finally form clinical medicine are related in different contexts.

The student's mind and imagination are no longer bogged down with endless facts that are apparently unrelated. Traditional chores which would only be useful to a student if he specialized in a particular field are being omitted. I have carried the fermentation pattern of the *Salmonellæ*, the interconnexion of the cranial nerves and about fifteen named signs of exophthalmos and ophthalmoplegia in my head for over thirty years, waiting in vain for an opportunity to use them. The student, providing he is courteous and constructive, is encouraged to say what he finds useful and what he finds unrewarding. Great pains are taken to maintain the initial enthusiasm throughout the clinical years.

Elective periods allow students to strengthen their weaknesses and, even better, study a particular field in greater depth. Students are encouraged to visit other medical schools and travel abroad, but not to excess. Even more important, in many medical schools a sizeable and increasing fraction of the more able students stand aside for a year for an Honours science degree to study one of the basic sciences at a more sophisticated level. In Edinburgh this is done by about 1 in 4 students. These men and women are an invaluable source of future teachers and research workers not only in clinical medicine but also in pre- and para-clinical subjects.

The British tradition of bedside teaching by the Hippocratic method to small groups of students, has continued unimpaired and is one of the great strengths of our medical education. It has been discovered that the final-year student is best employed working singly or in pairs in particular wards as an assistant to the resident without highly organized systematic teaching. This has also been done with complete success in peripheral non-teaching hospitals.

A great deal of what is proposed in the Todd report concerning undergraduate education is, where it is feasible, already underway and I have grave doubts as to whether the process of change should be made more abrupt. Another possible danger of these developments is the proposed large expansion of numbers in many medical schools. Unless this expansion is fully funded the whole system will be under intolerable strain. Small group teaching will be reduced and the proper staff and amenities for Honours science students no longer available. Research will be the first casualty.

Examinations are, as always, still under fire and it has been repeatedly demonstrated that they are very imperfect instruments. Multiple choice papers are more objective and are being generally adopted. The opportunity to dazzle the examiners with a brilliant essay, containing a minimum commitment to fact, will be lost but one cannot have it all ways. The reduction or elimination of examinations and the exclusive use of continual assessment was, initially, very attractive to students but they are now having second thoughts. Many do not relish the idea of being assessed from week to week and appreciate that the stimulus of examinations is a blessing in disguise. The present mandatory use of external examiners is an invaluable system of communication between different medical schools. It also ensures a maintenance of reasonable standards of education and examination. Although we must continue to seek more objective methods of examination, particularly in the clinical field, our present system is more benevolent than punitive and is not, in my opinion, one of our major probems.

Present Trends and Difficulties

Professor Christie (1969) in his Harveian Oration pointed out that the number of full-time academic clinicians in teaching hospitals in the United Kingdom is very considerably less, in relation to student numbers, than in North America or Sweden.

Yet is it feasible or practical greatly to increase these numbers? There is a slow but definite increase but it is tolerably certain that the universities will be unable to provide finances to increase the numbers of full-time academic clinicians to anything near to those in North America. Despite the fact that most medical academic units are considerably under-funded, new chairs and departments are, of necessity, being created to deal with new subjects and disciplines. The

university staff of many new departments consists of one head and one secretary. As costs rise there is ever-increasing competition for limited university funds, and both old and new departments suffer considerable financial frustration. The recent decision greatly to increase our student numbers during these lean years necessitates available money being used for essential pre- and para-clinical teaching and a significant increase of university clinical staff must have low priority.

As I have already mentioned, recurrent funds for medical departments are not large. Grants from the Medical Research Council, the Advisory Council on Medical Research (Scotland) and many other fund-giving bodies are a great help in supporting research. However, these grants are usually for only a few years at a time and it is difficult to plan long-term coherent research, particularly while the temporary staff are, quite reasonably, keeping one eye open for more permanent and secure employment.

The junior (or supporting) university staff have a considerable number of problems. If a young doctor becomes a lecturer in a department of medicine, he may have difficulty in some regions in obtaining a satisfactory equivalent honorary National Health Service status. He is also aware that when he is in front of appointment committees for senior registrar or National Health Service consultant posts, he may well meet the criticism that his university duties and particularly his research must have prevented him from obtaining a really well-founded clinical experience. Yet these men have an excellent record in senior vocational examinations and although their total clinical work may sometimes be less than that of their full-time colleagues, the frequent group discussions of clinical and related problems in an academic atmosphere more than compensate for this. To be fair, the records show that when these men apply for NHS appointments they usually do well in highly competitive fields. However, they are, as I was, very sensitive about this criticism.

The new proposals concerning in-post and postgraduate education and the possible development of accredited training posts and activities would appear to add to his difficulties. Should he ask, and will the university allow him, to attend vocational courses and lectures regularly in normal working hours? If he devotes a considerable amount of his time and energy to research and is a year or two abroad on travelling research fellowships will he, in the end, be the odd man out in regard to specialist registration and in competition for NHS consultant posts? It is hoped that research and academic achievement will be given due credit but with organized specialist training the fastest route to the goal will be that which excludes all other activities, and I fear that these pressures will tend to persuade the young potential academician to seek security in the more orthodox specialist training appointments. This would be a great loss, as all will agree that many of those who have contributed most to new concepts and developments have had most unorthodox careers, often moving from one discipline to another during their professional and intellectual development.

If I may dwell briefly on specialist training and accreditation, I find it difficult to believe that this will compare favourably with our present system of Advisory Appointments Committees. These Committees look at a man's record and personality, they assess his special contributions and intellectual attainments and balance these against his clinical skill and experience. National Panel representatives have the formal responsibility of ensuring that his clinical status is appropriate to the appointment regardless of his other achievements. This system deals efficiently with men of varying backgrounds and experience and, despite his fears, is not unfavourable to the young clinical academician.

The complexity of modern medical science and techniques now demands a considerable number of years of special and expensive training. Too many men once trained move, of necessity, to predominantly clinical appointments before they have fully exploited their skills and originality. This is most inefficient and uneconomical. We are in great need of a system where longer research careers are feasible without the danger of being excluded from higher appointments and appropriate rewards.

The increasing rotation of NHS senior registrars and even registrars poses another problem to the academic units as this is only possible to a very limited extent and, again, the young academician feels separated from the main body of medicine.

Finally, marriages are now far earlier and many of these young men have all the responsibilities of a young family at a time when they are deciding on the direction of their careers. It is not surprising, therefore, that with the highly restricted ladder in academic medicine and all these doubts and difficulties, there is a serious decline in the number of talented young doctors being recruited into academic medicine, and this despite the striking rise of the general level of ability of medical students in the last ten years. This decline in recruitment has been slow and undramatic. It relates to quality rather than quantity. The house is not on fire but its foundations are threatened. If this trend continues it will have most serious effects on the whole of medicine.

Turning to the NHS supporting hospital staff, these doctors usually work in units or firms where

the staff, being related solely to service needs, is far smaller. Their clinical responsibilities are heavy and they often have added teaching duties. They rarely have the time or facilities to carry out as much research as they would like although academic units do all they can to help such men. They feel that this will be held against them when they are competing for senior NHS appointments. The rotation of senior registrars to special units for particular clinical experience, although professionally rewarding, has also decreased the amount of investigative work they can do. They fear that the university staff will ascend the clinical scale by irregular routes and, with good research records, offer formidable competition for higher appointments.

Thus, as is often the case, each group feels insecure about the other. In discussions many young doctors feel that there should be a unified junior hospital staff structure with varying options in the teaching hospitals. There is much logic in their arguments, particularly at a time when we are seeking to build medical divisions rather than medical departments.

What is the future of the Medical Professorial Unit as we know it? Can a consultant staff of about three with forty to sixty beds, most of which are committed to emergency admissions and admissions from general medical outpatient clinics, possibly cover more than a fraction of the ever-widening field of modern medicine? Almost all physicians who are now appointed to consultant posts in teaching hospitals are experts in a particular field. If they were not they would not be there. Similarly, the academic consultant staff must also have strong specialist interests not only in research but also in routine clinical responsibilities. Most hospitals now aim in their staffing plans to have one or two super specialists in all major clinical fields. These may be university or non-university physicians but the fact remains that the university teachers can only cover a small proportion of specialties and that special clinical areas or units must be largely based on NHS staff and amenities. There are often various links with the university structure such as honorary or part-time university appointments and, very occasionally, some capital, research funds and even a lecturer may be provided. Most of these specialist units are under-supported, particularly with regard to investigative and research activities. They live from hand to mouth with temporary support from various fund-giving bodies.

Yet the function of such units is very similar to that of the departments of medicine and each is incomplete without the other. The obvious solution is a Division of Medicine and the recent proposals have been largely welcomed, although both the university and the NHS units are justifiably cautious. There has been little evidence of careful consideration of the many difficulties involved. The senate/faculty/departmental university structure is a vertical one and largely self-contained. How can this integrate with the horizontal structure of NHS units whose staff are mainly responsible to their hospital and NHS administrative structure?

If a Medical Division is set up then there should be a rotating chairman, not necessarily the professor of medicine. To be really effective, such a chairman should serve in this capacity for a number of years. Most of the consultants within very highly specialized fields are relatively young, they have strong research and investigative interests and often heavy specific service duties (intensive care, renal units, coronary care, endocrine units, &c.). It is doubtful if many of them will have the time or the inclination to take on the heavy and demanding duties of a divisional chairman. How many senior academic physicians or part-time physicians would be willing to carry this extra burden? The main difficulty will not be choosing a chairman but finding an appropriate person who is willing and able to serve.

The research organization of the Division will also raise many difficulties. The situation would be unbalanced and unfair if only those with full-time university appointments could obtain reasonable recurrent funds and apparatus and supporting lectureships from university sources. Yet there is a strong need and desire for research far beyond the present university departments. Can this research be sponsored by the university? Unless there are marked changes in the financial situation this is unlikely, even if it were desirable. It has been proposed in planning new teaching hospitals that the NHS should provide research areas for NHS staff. This proposal has, in some cases, been received not unsympathetically. It would mean new dimensions of expenditure by the NHS and formal links with the university research organization would be needed.

Flexner, who largely anticipated the present situation when larger areas of the teaching hospital would wish to be involved in more research, did not, as far as I know, ever foresee the NHS in this country as it is today.

I would emphasize again, that within the teaching hospitals, the university and NHS have become inextricably entangled not only in regard to service but also in regard to teaching and research. How could it be otherwise when both organizations have these three responsibilities? Originally the emphasis was very different in university and NHS units but this difference has diminished markedly in recent years.

There is another critically important trend. An increasing number of teaching hospital consultant

staff are electing to take full-time appointments. In the teaching hospital in which I serve, all NHS consultant physicians who have been appointed in the last ten years have opted for full-time service, a few with shared NHS and university appointments (A+B) and the remainder with full-time NHS sessions but with 3–4 of these sessions being allowed for university work in association with a specified university department. The choice of the department, which rests with the consultant, may be medicine, therapeutics, physiology, genetics, &c. These men, who have a free choice between full-time and part-time sessions after their appointment has been made, obviously consider the full-time teaching hospital life both agreeable and rewarding. It is said by some that their life is too easy and that they have neither the full responsibility of university duties nor those of private practice. In my own experience, I have not found this to be so. They are devoted clinicians, to be found at work day and night, who contribute greatly to teaching, research, the supervision of younger men and the other host of activities of a busy teaching hospital.

Another important fear expressed is that, with so many full-time physicians, there may be some loss of contact with the medical organization and problems outside the hospital. This is an important point and I will return to it later.

We see that, even in the present complex structure, the teaching hospital is evolving closer and closer to Flexner's ideal. The part-time physicians are now tending to concentrate their sessions as far as possible in their teaching hospital and the proposal that they should have facilities for so-called 'geographical private practice' has gained considerable support. We are very close to a position where the Medical Division can be made into a highly viable and efficient organization but a great deal of urgent and detailed discussion is necessary, not only at the hospital and regional level but also in the ministries and universities. I do not think many will regret the passing of the relatively isolated medical professorial unit with its hierarchical and frustrating staff structure. Peart suggests that the professor of medicine is dead but I would maintain that they have a great deal to do before they lie down. They, with others, must ensure that even if a new organization is created, the fruitful and successful features of the academic clinical units are not lost but are extended.

Recent trends in medicine towards super-specialization, not only in outpatient clinics but also in clinical and investigative areas, raise the urgent question as to whether teaching hospitals should continue to consist mainly of a number of general medical and surgical firms or charges. In the past this arrangement has ensured good general teaching and experience of students and doctors and it has been administratively convenient. However, it is in the patients' interest that they should be seen and treated by those with the greatest expertise in their disease. I do not accept the common criticism that super-specialists are totally blind outside their particular area of interest, particularly as they all have general medical experience and, not infrequently, some general medical responsibilities.

It may be necessary, in the not too distant future, seriously to consider the complete restructuring of the medical services in teaching hospitals into a series of special purpose wards and units. This process has already started to a varying degree in many hospitals and is another clamant reason why the academic structure will have to be correspondingly reorganized.

The radical changes of organization of NHS medical services proposed in the last Green Paper (DHSS 1970) are, in this context, a matter of serious concern. Sir John McMichael (1970) and others have pointed out the great potential dangers to the teaching hospitals and academic institutions of British medicine. There is a real hazard that an effective voice of the teaching hospitals and university will be largely lost in the Area Boards. They will have less influence in the appointment of staff and may well lose their endowments which have been invaluable both in improving amenities and in supporting research. The right to admit patients from outside area boundaries may be impaired to the detriment of both service and academic standards of the highly specialized units. The influence of medical schools and universities in their regions could be reduced, particularly in relation to postgraduate teaching.

There appears to be little or no preoccupation with the development or even maintenance of the hard-won position of our medical schools on whose excellence the whole standard of the medical service depends. Since the appointed day the NHS and universities have worked increasingly together, and have immeasurably improved the standards of treatment, teaching and research. The process has been slow and far from easy. It has been contributed to by innumerable NHS and university consultants and ingenious and co-operative hospital and university administrators. There is a nightmare quality to proposals that largely ignore and, indeed, will tear out many of the roots of our professional training. As Sir John

McMichael concluded 'tragic damage could be done to a great science-based profession'.

I have one further concern (and this is my last message of woe). After a long initial delay, the so-called Pater Formula began to be applied about ten years ago. This formula was designed to help build university departments in teaching hospitals. Special funds were made available to allow both the NHS and the universities to join in building departments which had both service and university functions. In many instances recurrent expenses were also shared. This procedure was a realistic and encouraging acknowledgment of how closely the NHS and university departments were linked in the teaching hospitals and augured well for the future. However, the dimensions of hospital planning and expansion of medical schools have made administrators and planners more and more cautious about this excellent scheme. We are reverting to the position where a detailed definition of service and university function and precise delineation of financial and other commitments is being sought once more. This would appear to me to be a serious backward step.

Now I will spend a little time on the problem of university departments and community medicine in its widest sense. There is an increasing demand that both hospital and university medicine should extend into the community more effectively. From a university point of view this is desirable for a number of reasons. First, the hospital scene gives a concentrated but highly false picture of the whole of medicine. The student does not have the opportunity to see and study the patient in relation to his environment, nor will he develop a sense of continuity of care which is so greatly needed. He should see the general practitioner at work and appreciate the attractions as well as the difficulties of this important branch of medicine. Clinical departments and departments of social medicine and general practice work increasingly together but neither the teachers nor the students are fully satisfied. In practice, as in teaching, it is very, very difficult to make a genuine continuum of hospital and community medicine. There have been many long pauses at committee tables when precise plans and proposals are sought. The linking of multiple-practice health centres to a large teaching hospital-based health or community centre has been suggested and this proposal is worth examining more closely. With the increasing development of special units and clinical areas in hospitals, might it not be feasible to have selected general practitioners who would take over a considerable number of the present duties of the general physician?

The new type of community physician proposed in the Green Paper has a number of duties, one of the most important being the constant collection of objective information concerning all branches of medicine in the community in order to judge what is needed and what is available. He also has the responsibility of health education. Yet no mention is made of his role in medical education or links with the medical schools and the student.

The aging population is becoming an ever increasing part of our medical responsibilities. Should not geriatric units be linked with teaching hospital units in some way with sharing of medical and nursing staff? There must not be different standards for the young and the old.

Some may fear that, if the academic departments spread their influence and energy too far, then their capacity for research and scholarship may suffer. This criticism can be and has been made about any extension in almost any field of human endeavour. I am confident that patient treatment, teaching and research will be all the richer and more fruitful in a wider and more realistic field.

In conclusion, I have reviewed some of the contributions and achievements of clinical academic departments. I have tried to answer some criticisms and mentioned a number of present difficulties. I have supported the thesis that the present state and structure of medicine demands a radical change in the old traditional academic departments. I have high-lighted the remarkable interlocking of the universities and NHS and the folly of proposing radical changes of the NHS with but little consideration of the effects this may have on our medical schools, university departments, teaching and research.

I hope I have offended no one. This task has not been easy and I might have been wiser to have discussed developments in cardiorespiratory medicine. The difficulties before us are many but the medical profession is a great profession with a strong common purpose and it is this which makes me confident of the future.

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